

# GENERAL PROPERTIES OF THE RONGORONGO WRITING\*

*Jacques B. M. Guy*

## INTRODUCTION

MANY, PERHAPS MOST, OF THE PUBLICATIONS on Rongorongo have been attempted decipherments, some failed, some fantastic, and surprisingly little has been done to analyze the patterns evidenced in the parallel texts discovered by Boris Kudrjartsev sixty years ago. Guy (1982,1985) and Pozdniakov (1996) are about all that exists. Pozdniakov's 1996 article is somewhat incomprehensible, and there are compelling reasons for it being beyond the reach of all but a very few readers:

1. There exists, even now, no terminology for describing the signs and their constituting elements, how they combine, and how they alternate as evidenced in the parallel texts discovered by Kudrjartsev.

2. Researchers have used, for want of any other, the transcription system invented by Thomas Barthel and first published in 1958, in which each sign is represented by a numerical code up to three digits long, completed by some alphabetic suffixes when ambiguities arise. This system, however, does not form a coherent whole. Signs that occur in the corpus are often missing from Barthel's list, and signs that occur in Barthel's list are often assigned numerical codes in breach of the very principles that he explicitly stated, so that Pozdniakov found himself forced to elaborate his own adaptation of Barthel's system, incomprehensible to anyone unfamiliar with the problem.

3. There is no standard way of specifying the position of a sign in the corpus beyond giving the tablet, the side and the line where it occurs. In Barthel's system the tablets and the very few other inscribed objects are referenced by a single capital letter. When applicable, the side is specified by a lowercase letter, r for recto and v for verso when known, or by a and b, arbitrarily assigned, when unknown. Then the lines are numbered from bottom to top, as we know they were read out. Thus for instance "Ca6" refers to Tablet C (also known as "Mamari"), side a, line 6, counting from the lower edge. Since the tablets were carved lengthwise and the signs are small (10mm wide on the average), a single line typically carries scores of them, and you have to scan the whole line to locate the signs being discussed. Numbering them would be impractical: their widths vary, and there is no consensus as to what are compound signs, or how to count them.

Those difficulties are intensified by the fact that there exists no photographic corpus. One can only turn to the line drawings in Barthel (1958). The draftsmanship is fine; they were produced by tracing over rubbings so that they should be quite faithful to the originals. However there are mistakes, probably due to cases where the rubbings were unclear, and parts of the signs had to be guessed at. Consequently we never know whether this or that sign is an accurate tracing, and in the absence of comprehensive photographs we can

never be certain. The available corpus thus suffers from much uncertainty. This state of affairs is all the more regrettable, scandalous even, that the technology for making holographic reproductions, let alone photographs, was already available twenty years ago and that now, with the advent of digital photography, the task would involve negligible costs beyond travel. This is vandalism by neglect.

This study consists of six main parts:

The parallel texts and their importance for the decipherment.

An explanation of the conventions used here in representing and referencing the corpus, and the general principles of Barthel's transcription system.

The combinatorial properties of the signs, how they are arranged into a continuous text.

The internal structure of the signs, how they are formed of modular elements and how these elements combine.

Tentative interpretations of some glyphs drawn from those observations. They are to be understood as mere working hypotheses, the likelihood or unlikelihood of which cannot be estimated.

A summary of those properties of the script that are beyond reasonable doubt.

I will mention ancient Egyptian and draw some parallels with Chinese and Maya. Let this not be misinterpreted as suggesting that the Rongorongo might be in any way derived from those writing systems or related to them. At any rate, the onus of proof would lie with those who would be so misguided as to make such claims. Let us turn now to the one milestone in the comprehension of the Rongorongo.

## THE PARALLEL TEXTS

During World War II a small group of students in St Petersburg (then Leningrad) became interested in the tablets on display at the Museum of Ethnology and Anthropology. Eventually, they discovered that the same hieroglyphic text occurred with minor variations on three tablets (H, P, and Q). Their findings were written up by one of them, Boris G. Kudrjartsev, who died in 1943, and were edited and published posthumously by his mentor Dmitrij A. Ol'derogge under the title "Pismennost' ostrova Paskhi" (The Writing of Easter Island). For those who can read Russian, Kudrjartsev's seminal discovery can be found on the Web at <http://www.rongorongo.org/bk/index.htm>. The article was contributed by Konstantin Pozdniakov and its Web version proofread by Paul Horley.

Kudrjartsev's discovery has allowed us to verify that the direction of writing was indeed as described by Mgr. Étienne "Tepano" Jaussen (Tepano is the Tahitian pronuncia

\*This paper has been peer reviewed.

















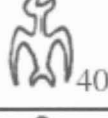
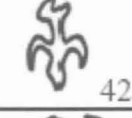





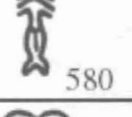
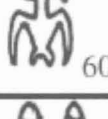







 f 1	 a b af bf 22	 36	 a b c 67
 100	 113	 a b c 160	 180
 200	 211	 260	 280
 300	 321	 360	 380
 400	 421	 460	 480
 500	 521	 560	 580
 600	 601	 660	 680
 b c 700a	 a b 721	 760	 780

Figure 1a: Sample of glyphs as arranged into the seven series of Barthel's list.







 144	 59	 39	 545	 40	 41
	properly: 144f		properly: 39x		properly: 40y

Figure 1b: Some examples of Barthel's inconsistent use of his own coding system.










 570	 574	 575	 576	 577
 578		 579		

Figure 1c: The seven glyphs of the "chevron-headed" series.

tion of Stephen, which is Étienne in French). It further allows us to reconstruct to some extent, if not the meaning of the signs, at least the rules of their composition, and their probable function, by studying their variations from one tablet to another. Those rules have lead Konstantin Pozdniakov to think that the elements entering into the formation of most signs had phonetic values, probably syllabic, and that they were combined so as to look like pictograms, most of them anthropomorphic, much "in the same way in which the letters of the Korean script are strung together not in sequences like alphabetic letters but rather arranged within notional squares to look like Chinese characters" (Robinson 2002:243).

#### THE CORPUS AND ITS PRESENTATION: TERMINOLOGY, DATA AND NOTATIONAL CONVENTIONS TERMINOLOGY

There is no universally accepted terminology for discussing writing systems. This is likely due to modern linguistics having concerned itself with the spoken language and neglected the written. The glossary in David Crystal's *Cambridge Encyclopedia of Language* has a full set of terms nicely paralleling phonological theory: grapheme (phoneme), graph (phone), allograph (allophone), graphetics (phonetics), graphemics (phonemics), graphology (phonology). But these terms are tainted by long-accepted prior usage. "Graph" naturally conjures up "graph" as in "graph theory" or "graph paper," and "graphology" the belief that handwriting reflects a person's character. As for "graphetics" I cannot help think of "Japhetic," the long discredited theory of the Soviet linguist Nikolai Marr (see [http://en.wikipedia.org/wiki/Nikolay\\_Yakovlevich\\_Marr](http://en.wikipedia.org/wiki/Nikolay_Yakovlevich_Marr)).

Compounding the confusion, the Russian School has been using the term "grapheme" to cover what is all at once graph, grapheme and allograph in Crystal's glossary. Seeing that Mayanists use the term "glyph" I will write here in terms of glyphs, alloglyphs, and so on, as they are not tainted with prior usage as "graph" and its derivations are. Under this definition G, G, , g, g,  and  are all *alloglyphs* (variants) of the same *glypheme*, the letter "g." In other words, a *glypheme* is a set of *glyphs* the members of which are *alloglyphs* of one another ("set" in the mathematical sense of the term). But things are not so simple. For instance, what is "\$" if not an *alloglyph* of "dollar" or "dollars," itself a *sequence* of *glyphemes*?

#### Data

For want of a better source, this study relies on photocopies of the line reproductions in Barthel (1958). They were scanned at 400dpi then edited by cutting and pasting so that each line of the hieroglyphic text would occupy one single image, often very wide (11,200 pixels for line 14 of the Santiago Staff). The resulting images were digitally modified for printing first by blurring, next by setting the gamma correction to about 0.35, finally by increasing the contrast when required. Although the fact is not mentioned by Barthel, those reproductions are all to the same scale, approximately 57%. This means that, on scans at 400 dpi, one pixel corresponds to 0.11mm and 230 pixels to one inch of the hieroglyphic text.

The glyphs, then, can readily be located by tablet, line, and position from the beginning of the line expressed in pixels: within almost any image-editing program, when you point at a glyph, the position of the pixel being pointed at is usually displayed in a format such as (x = 221, y = 19). Divide the figure for the x-coordinate by 9 to translate it into millimeters, by 230 into inches. I shall use units of 10 pixels here, about one millimeter.

In this notation, for instance, Hv4.75-122 designates the sequence of glyphs on Tablet H, verso, line 4, extending from pixel 750 to pixel 1220, that is from 83mm to 134mm (3¼ in. to 5¼ in.) measured from the beginning of the line. Glyphs will also be identified by their numerical codes according to Barthel's transcription system. As discussed in the next section, this system is deficient, and it may have been better to use the "Extended Barthel System" elaborated by the Centre d'Études sur l'Île de Pâques et la Polynésie (CEIPP), which aims at removing the most glaring inconsistencies and at recording details which are ignored or cannot be represented in Barthel's original system. However, not only is this system extremely complex, but few readers of this journal are likely to know of it, let alone be familiar with it. I even doubt that many are conversant with Barthel's nomenclature, and so I will often use nicknames for the glyphs, as this makes it easier to identify them in the figures. Thus, for instance in Figure 3: "Big Ears holding a flower, Big Ears holding a staff" for compound glyphs 200.8 and 200.1

It is impossible to understand this article without referring constantly to its illustrations. The title of each section is therefore accompanied by a list of the figures needed to read it. Thus, in the title of the next section, "Figures 1A-C" warns readers that they will need to refer to Figures 1a, 1b, and 1c in order to critically examine the arguments and the explanations.

#### Barthel's Transcription System (Figures 1a-c, 5a, 3)

The majority of glyphs seem to depict people or animals. Barthel (1958:40-41) has explained how he had classified them into seven series based on their outward appearance.

- 1) Series 1 to 199: These are glyphs unlikely to represent people or animals. Barthel calls them plants, natural phenomena, or abstract notions. But note how glyph 180 (Figure 1a) is easily seen as anthropomorphic: a running warrior in a feather helmet for instance.
- 2) Series 200 to 299: Glyphs whose head features two protruding ears or bulging eyes.
- 3) Series 300 to 399: Glyphs with a round head, a gaping mouth, lacking the bulging eyes of series 200.

Series 400 to 499: Glyphs with the head of series 300, but with miscellaneous body shapes. Thus glyph 400, with the round head and gaping mouth, but with the body of a bird. But note how glyphs 460 and 480 are distinctly anthropomorphic with body shapes identical to glyphs 300 and 380. Only the neck is bent.

Series 500 to 599: Reserved for "anthropomorphic glyphs with miscellaneous head shapes." But note how glyphs 521, 560 and 580 are not anthropomorphic by any stretch of

imagination: 521 is geometric, 560 looks like a bird, 580 looks like a fish.

Series 600 to 699: Ornithomorphic glyphs.

Series 700 to 799: Other animals. 700 have been suggested as representing a fish, 721 a shark, 760 a lizard.

Several glyphs are often grouped under the same numerical code. In such cases lower-case letters are optionally suffixed to distinguish the glyphs, e.g. 67a, 67b, 67c and 160a, 160b, 160c. Further alphabetic suffixes are used to specify additions or transformations. The suffix *f* denotes the addition of “feathers,” e.g. 1, 1f and 22a, 22b, 22af, 22bf. The suffix *s* (for *schmuck* “ornament”) indicates a “ribbon” dangling from the glyph’s “elbow” (e.g. glyph 211s, Figure 5a). The suffix *h* (for *hoch* “high”) indicates that the glyph is superscripted (e.g. glyph 69h, Figure 3). The suffix *t* (for *tief* “low”) indicates that the glyph is subscripted; *x* that it is upside down; and finally *y* denotes a mirror-image.

But observe how Barthel’s glyph list often violates those very principles. Glyphs 160a and 160b (Figure 1a) are the mirror images of each other so that, logically, 160b should be 160ay. Glyph 59 (Figure 1b) is nothing but glyph 144 with added “feathers” and so should be coded as 144f. Glyph 545 (Figure 1b) is nothing but glyph 39 upside down, and should be assigned the code 39x, all the more so that the 500 series is supposed to be reserved for anthropomorphic figures with various head shapes, and that glyph 545 cannot be construed as anthropomorphic at all. Likewise, the two glyphs under code 41 (Figure 1b) are the exact mirror images of the two under code 40, and so should be represented as 40y or as 40ay and 40by if we wish to distinguish them explicitly.

Barthel occasionally resorts to two prefixes: a capital V for “variant” and a capital D for “derivation,” but the difference between the two remains unclear. Again he is at times inconsistent in their use. See for instance glyph D207 (bottom row, first column of Figure 3). This glyph differs from plain 207 by being “hollow-bellied,” but note how this other glyph, 577 (bottom row, second column, Figure 3), is also “hollow-bellied.” We would expect it to be treated as a derivation of a plain 577, all the more so that several similar “chevron-headed” glyphs occur without a “hollow belly” (570, 574, 575, 576, Figure 1c). Note also how glyphs 578 and 579 are the “hollow-bellied” versions of 570 and 575, and so, logically, should be represented as D570 and D575. Many more such inconsistencies will be encountered in what follows.

## COMBINATORIAL PROPERTIES OF THE RONGORONGO GLYPHS

Glyphs combine in a number of ways. They may occur merely juxtaposed side by side with an intervening space; or they may be linked together; or they may be stacked one above another. As a result, anthropomorphic glyphs often appear to be “holding” other glyphs in their hands. At other times, they seem to be wearing the other glyph as a mask. These combinations may involve head elision (when a glyph is worn as mask), or the elision of lower or upper limbs (when a glyph is stacked above another). Combination by stacking also often involves the rotation of the lower element, less frequently that of the upper element. The study of

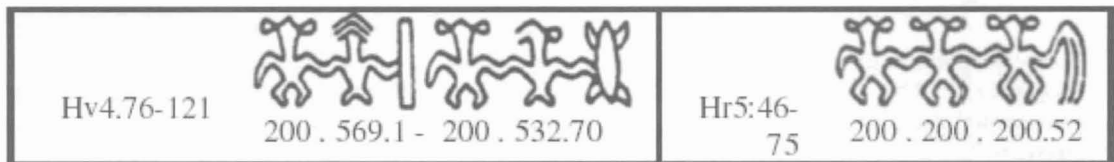


Figure 2a: Examples of multiple glyph connections.

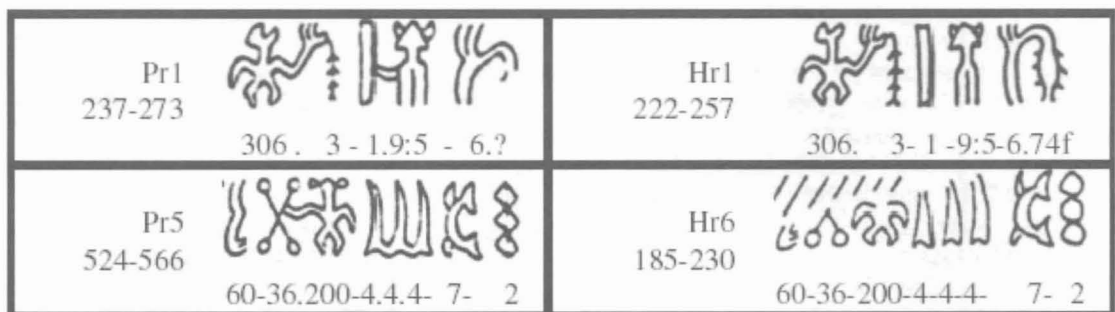


Figure 2b: Examples of connected and disconnected glyphs in free alternation.

the parallel texts suggests that these various ways of combining glyphs had no semantic function, but were at the whim of the scribe. Thus, for instance, a certain glyph X standing next to another glyph Y was equivalent to X holding Y, or to Y stacked on top of X, or to X wearing Y as a mask.

### *Juxtaposition: Connected and Disconnected Glyphs (Figures 2a-b)*

Juxtaposition is represented by a hyphen in Barthel’s system, connection by a dot. More than two glyphs often occur connected, e.g. 200.569.1-200.532.70 in Hv4.76-121 and 200.200.200.52 in Hr5.46-75 (Figure 2a).

It has long been known, but never explicitly stated, that glyphs connected to one another were equivalent to the same glyphs disconnected. Thus for instance in Pr1.237-273 (Figure 2b) a “staff” (1) is connected to a “scarecrow in a horned helmet” (9:5), but the same glyphs are found unconnected in its parallel segment Hr1.222-257 (Figure 2b).

Such alternations are extremely common. To give two further examples, in Pr5:524-566 (Figure 2b) a “St Andrew’s cross” (36) is held by “Big Ears” (200). The corresponding text in Hr6.185-230 is partly erased, but one clearly sees the arms of Big Ears (200) dangling, unconnected to the St An-



drew's cross (36) on the left. Immediately to the right, three "fangs" occur in succession, connected on Pr5 (4.4.4), but disconnected on Hr6 (4-4-4).

These observations show that "dangling arm" and "holding arm" alternate freely and are therefore *alloglyphs* of the same *glypheme*.

*Masks, Head Elision, Arm Elision, and a Glypheme Confirmed (Figures 3, 7)*

Right at the end of line Pr4 (Pr4.637, Figure 3) Big Ears (glyph 200) holds a flower (glyph 8) and is followed next at Pr5 by another Big Ears, this time holding a staff (glyph 1). The corresponding glyphs in Hr5.180-200 show Big Ears wearing the flower as a mask, followed by another Big Ears, this time "masked" with a staff (glyph 548). The heads have thus been elided in both cases.

Big Ears occurs again twice in succession in Pr4.536-566, once holding a flower and once a staff, but its counterparts in Hr5.85-118 also holds a flower and a staff, instead of wearing them as masks as they did in Hr5.180-200. We may safely conclude that "holding" and "wearing as a mask" are in free variation.

The "hollow-bellied Big Ears" in Hr1.44-79 (D207, Figure 3) has a "chimney stack" (69h) rising from his "wrist." The corresponding glyph (577) in Pr1.50-89 displays a similar chimney stack, but worn as a mask.

In the above examples, all cases of head elision affect the head of the 200-299 series of glyphs (Big Ears). If Barthel's coding system were coherent and systematic, it would be a simple matter, using a concordance, to ascertain whether head elision affects only the head of the 200-299 series. As things stand, there is no way of doing so, short of directly inspecting the reproductions of the hieroglyphic texts. For instance the section below, entitled "Glyph Harmony: Harmonic Sequences and Clefs," shows the elision of a 300-series head. In the middle of sequence Br3.30-178 (Figure 7) one sees a single glyph (231) where one expects the sequence 330.61.22.61, that is, glyph 330 holding com-

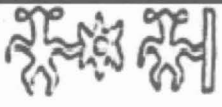





Pr4.637 -Pr5.12 200.8 - 200.1		Hr5 180-200 8:200-548	
Pr4 536-556 200.8-200.1		Hr5 85-118 200.8 - 200.1	
Hr1 44-79 1-D207.69h-700-280		Pr1 50-89 1 - 577 - 700-280	

Figure 3: Examples of "masking" and head elision.







Hr9 410-456 470-21ft-254-200.20		Pr8 556-600 V671-102f-354-200.20	
Pr5 70-128 2-41-220.9-220.9-440-440		Hr5 244-296 2-41-220.9-220.9-440-440	
Hv2 230-273 87.62-200.700.61-739-40		Pv4 363-403 87.62-200.700.61-739-40	

Figure 4: examples of glyphs "held" and "held aloft."

pound glyph 61.22.61, consisting of two lifted arms (61) flanking a "spindle" (22). Glyph 231 has the same lower limbs as glyph 330, but its upper half is entirely different, consisting of two lifted arms (identical to glyph 61) flanking a sort of "spindle" again, which Barthel has interpreted as an "earless" head of the 200-series, since he has assigned this glyph to the 200-series. We have here a clear case of elision of the 300-series head. This fact is quite impossible to recognize from the transcription alone; one must turn to the hieroglyphic text to discover it. Note how both arms of 330 (one dangling, one holding) have also been elided, to be replaced by the same "arms" as those of 61.22.61. This constitutes evidence that the dangling/holding arm *glypheme*, being freely elided, conveys little or no meaning.

#### *Holding and Holding Aloft (Figure 4)*

The "knobbed shield" (glyph 20) held by Big Ears in Hr9.410-456 becomes his uplifted arm in Pr8.556-600 (Figure 4). We observe a similar alternation at Pr5.70-128, where Big Ears appears twice holding a staff topped by a "horned helmet" (220.9-220.9) whereas the helmet becomes a continuation of his raised arm in Hr5.244-296. Similarly, Big Ears holds a fish (700) connected to a lifted arm (61),

both resting on the ground in Hv2.230-273, but holds these “aloft” in Pv4.363-403. These alternations suggest that “holding” and “holding aloft” fulfill the same function and occur in free variation. Note how Barthel’s system does not distinguish between connection, “holding” and “holding aloft”, all being represented by a dot. Some may argue that there was no need to distinguish those three ways of concatenating glyphs since they are equivalent. The argument is fallacious: in order to establish that they are equivalent we need to distinguish them in the first place, and failing to do so is begging the question.

“masking.” We have already noted a case of elision of the dangling/holding arm glypheme. Here, we see that the lower limbs, and so, the entire glyph, have been elided as well. Note how the shape of the leg of “van Gogh” (200) connecting to the crescent on the left is indistinguishable from his connecting arm above. Also note how similar is his other, flexed leg, to the dangling arms of glyphs 200 and 300. We observe another case of leg elision and of crescent rotation when we compare segments Br1.52-99 and Br1.157-203 (Figure 5a). The repetitive pattern on this line leads us to expect the glyph sequence 50-301s-4-2-40-211s-91 to be repeated in Br1.157-



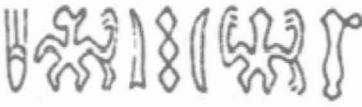
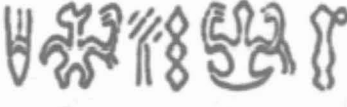

Pr8 359-405		Hr9 224-271	
4.600y-40.200.V700-430.76-V432y-4		4. 600 - 700:42-624.76-301s -4	
Note how 40-200.V700 corresponds to 700:42			
Br1 52-99		Br1 157-203	
50- 301s - 4- 2-40-211s - 91		50 - 301s - 4 - 2 - 211s:42 - 91	
Note how 40-211s corresponds to 211s:42			
Ca12 60-137			
47 - 60-10.8 - 326 - 275 . 8 - 60 - 70-50			
Note how 60-10.8 is repeated as 275.8			

Figure 5a: Stacking with rotation of the bottom element.

*Stacking, Glyph Rotation, Leg Elision and Further Alloglyphs Identified (Figures 5a-b)*

Glyphs do not only occur in succession from left to right (connected or disconnected), but also one above the other, sometimes connected, sometimes disconnected, for instance as in Hr9.224-271 (Figure 5a) where a “fish” (glyph 700) is seen above a reclining crescent (glyph 42). Barthel expresses this vertical combination by a colon, without distinguishing whether the two glyphs are connected, as are 211s:42 in Br1.157-203 (Figure 5a), or disconnected, as are 700:42 in Hr9.224-271. Since there is no accepted term for this type of combination, I shall coin one: stacking.

Pozdniakov (1996:296) notes how the three connected glyphs 40.200.V700 in Pr8.359-405 correspond to the two stacked glyphs 700:42 in Hr9.224-271 (Figure 5a). Glyph 40.200.V700 consists of “van Gogh” (Big Ears without ears) holding a crescent (40) in one hand and a “spiny fish” (V700) in the other. The corresponding glyph 700:42 in Hr9 is a reclining crescent (42) topped by a fish (700) with “van Gogh” entirely missing. Note how glyph 42 is glyph 40 rotated 90 degrees counterclockwise. It has been mentioned above how the “Big Ears” head of the 200 series is elided in cases of

203 (Guy 1982:446), but we see instead 50-301s-4-2-211s:42-91, where the crescent (40) followed by van Gogh with his arms raised (211s) is replaced by a single glyph, transcribed 211s:42 by Barthel. This glyph is identical with the van Gogh of Br1.52-99 but for its lower half, a sort of “rocking base,” which has replaced both its flexed legs. The rocking base is in fact the crescent (40) rotated 90 degrees counterclockwise. (This had led me to suggest at the time that stacked glyphs were read from bottom to top, in reverse order of Barthel’s transcription system, which lists them from top to bottom. Pozdniakov has reached the same conclusion independently since then.) This now probably constitutes sufficient evidence for recognizing the “connecting leg” and the “flexed leg” as two further alloglyphs of the dangling/holding arm glypheme. Not only are their shapes similar, but they behave in like fashion, and, being elided in the same environments and conditions (stacking), they are also likely void of any meaning, their only likely function being to give the glyph an anthropomorphic appearance.

An interesting case of probable glyph rotation occurs in Ca12.60-137 (Figure 5a) where a “vertical arm” (60) is followed by a “raised club” (10) connected to a “flower” (8).

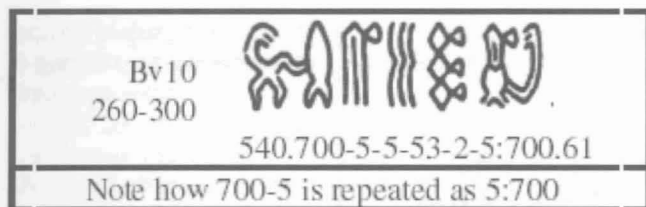


Figure 5b: Stacking without rotation of the bottom element.

Glyphs 10 and 8 are very common, 293 and 152 occurrences respectively, but this is a very rare combination which occurs only here and on Hv6 and Pr8, but disconnected. Consider now glyph 275 that occurs shortly afterwards. Its raised arm is connected to a "flower" and forms a picture strikingly similar to the "club and flower" (10.8) just before. Further, its "stretched leg" resembles glyph 60 rotated counterclockwise. Its head is that of series 200, which is often elided; its



Figure 6: Taxogram omission in Modern Chinese.

other arm is the dangling arm, regularly elided in stacked glyphs, and probably void of semantic or phonetic value. It seems that we have here in 275.8 a "verbose" repetition of the sequence 60-10.8, arranged to look like an anthropomorphic pictogram. Once again, Barthel's transcription does not allow us to recognize this very likely equivalence: there is no visible commonality between "60-10.8" and "275.8."

Not all cases of stacking involve the rotation of the bottom element. See for instance Bv10.260-300 (Figure 5b), where the sequence 700-5 occurs twice, the second time stacked, but with the "fish" (700) un-rotated. Likewise glyph 580 is an un-rotated fish connected to a "chimney stack" above it (Figure 1a).

#### *Digression: Evidence for Glyph 200 being a Taxogram (Figure 6)*

We now have accumulated evidence that the head and the limbs of glyph 200 could be omitted individually, severally, or wholly, without impairing comprehension, and that its upper and lower limbs, as well as their "holding" and "connecting" variants, were alloglyphs of the same glypheme, the sole function of which was to make the figure whole. This behavior is not compatible with these elements having phonetic values. It suggests that only the head may have been meaningful, yet could be dispensed with, such as in the case of "masking." In other words, "Big Ears" was probably a semantic classifier, a taxogram.

The omission of taxograms is common in mixed ideographic and phonetic writing systems such as ancient Egyptian, Maya, or Sumerian. It even occurs, but only exceptionally, in modern Chinese. For instance, when taking an order of shrimp ("xià" in Mandarin) a waiter will seldom bother to write the full character, but will omit its left-side element (a taxogram for reptiles, batrachians and invertebrates), and will only write its phonetic element as the character which, alone, means "down, under" and is pronounced "xià" (Figure 6).

Although the argument that glyph 200 is a taxogram more rightly belongs in the last section ("Tentative Interpretations"), it flows naturally enough from the observations made so far so that this seemed the better place to present it. Let us now turn back to the combinatorial properties of the Rongorongo.

#### *Glyph Harmony: Harmonic Sequences and Clefs (Figure 7)*

Glyphs often occur in sequences, each member of the sequence repeatedly associated with the same glyph. A striking example is found on Br3.30-178 where the same glyphs occur in the same sequence, each time associated with glyph 330, and then again in Br3:210-Br4.38, but this time associated with glyphs 381, 384 or 745 (note how glyphs 381, 384, and 745 only differ by the shape of their hands). Finally, the

Br3 30-178	
	330.755-3304.64-330.43:50-330.4-231-330.15-330.569-330-16-330-2-330.20.6-330.749
	Harmonic sequence with 330 as its clef
Br3:210 -Br4:38	
	493-755-381-4.64-381-43:50-384-4-384-61.22.61-384-15-745-569-1-745-16-745-2-745-20.6-745.697
	The same sequence, with 381/384/745 as its clef
Br6 84-232	
	290.63-755-63-4.64-V63-43:50-63-4-63-61.22.61-63-15f.63-569-63-1f-63-16t-...-63-D16-63.37-63-20.6-63-618
	The same sequence again, with 63 as its clef

Figure 7: Three similar harmonic sequences on Tablet B.


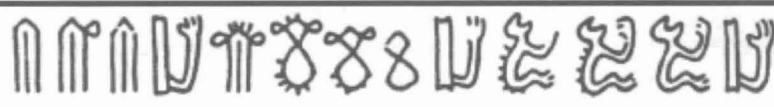
Ab6 732-772	 381 - 2 - 381 - 2-50-50
Ca5.260 -Ca6.102	 5 - 5 - 5 - 1.6 - 5f-D2-D2-D2 - 1.6 - 381f-381f-381-1.6

Figure 8: "Number harmony" or the tendency of glyphs repeated  $n$  times to occurs near other glyphs also repeated  $n$  times. Here  $n=2$  in segment Ab6.732-772 and  $n=3$  in segment Ca5.260-Ca6.102.


Ab6 496-554	 70.2-70.52-70.52-70-2-70-2
----------------	---

Figure 9: Glyph and number harmony combined.

same sequence is repeated a third time in Br6:84-232, this time with each of its glyphs associated to glyph 63 (Figure 7).

Once again, there is no accepted terminology for this phenomenon. I shall speak here of "harmonic sequences" and of "clefs." For instance, sequence Br3.30-178 is a harmonic sequence and glyph 330 is its clef.

Note the compound glyph 61.22.61 (a "spindle" with lifted arms) in the middle of Br3:210-Br4:38 and of Br6:84-232. We expect the same compound glyph in Br3.30-178, preceded by glyph 330, the clef of this harmonic sequence. We find glyph 231 instead. It has been explained above how


























 200	 201	 202	 203	 204
 300	 301	 302	 303	 304
 400	 401	 402	 403	 404
 500	 501	 502	 503	 504
 520	 521	 522	 523	 524

Fig.10a: Some hand and arm shapes in a variety of glyphs.









							
0	1	2	3	4	5	6	7

Figure 10b: The eight hands and arms represented by the third digit of Barthel's codes.

this is most probably a case of conflation by stacking of glyph 330 with compound glyph 61.22.61.

#### Number Harmony (Figure 8)

Simple and compound glyphs, as well as glyph sequences, often occur duplicated, and there appears to be a strong tendency for such duplicated glyphs to occur in the vicinity of other duplicated glyphs.

Thus for instance at the end of line Ab6 where the sequence 381-2 occurs duplicated and is followed by glyph 50, also duplicated: 381-2-381-2-50-50 (Figure 8). Triplication is less common, yet triplicated glyphs, or sequences, also seem to occur preferably near triplications, thus on lines Ca5 and Ca6. We may speak of some sort of "number harmony."

#### Probable Nature of Clefs (Figure 9)

The fact that many different glyphs are found functioning as clefs and the repetitive nature of clefs (e.g. glyph 70 in Ab6:496-554, Figure 9), make it very unlikely these glyphs should have a phonetic value when functioning as clefs. It is more likely that they functioned as taxograms (semantic classifiers). However, they may have had phonetic values when not functioning as clefs of harmonic sequences.

#### Glyph and Number Harmony Combined (Figures 8, 9)

One often encounters repetitive patterns such as in Ab6.496-554 where the clef is 70 (Figure 9). They seem to be a combination of glyph harmony and number harmony. Figure 8 shows another example of this pattern, in segment Ca5.260-Ca6.102, where the clef is compound glyph 1.6.

#### Internal Structure of Rongorongo Glyphs Anthropomorphic Glyphs (Figure 10a)

Many glyphs present a clear anthropomorphic appearance, typically composed of a head, two arms and two legs. Each anthropomorphic glyph is represented in Barthel's system by a 3-digit code, with the first digit indicating the head, the second the legs, the third the arms. The arms, especially when lifted, often end in what is easily seen as the representation of a hand. A few anthropomorphic glyphs display only one leg and two arms (series 370) or one leg and one arm (series 380). These glyphs all have the same leg shape, stretched out, as if sitting in profile. There appears to be a much smaller range of leg shapes than of arm or hand shapes. With very few exceptions, the shape of the body is predictable from its limbs.



*Hand Shapes—Third Digit of Codes (Figures 10b-e, 11a-b)*

Barthel uses digits from 0 to 7 to distinguish between eight hand or arm shapes (Figure 10b). The system holds well for series 200 and 300 only, and it breaks down for the other series, so that one cannot confidently predict the arm shapes of those glyphs from their code numbers alone (see for instance glyphs 500-504 and 520-524, Figure 10a).

Digit 0: arm relaxed, dangling

Digit 1: arm lifted, hand always turned inward, toward head, three fingers showing

Digit 2: arm lifted, hand clenched in a fist

Digit 3: arm lifted, hand pointing down, no fingers showing



Figure 10c: The glyphs represented by Barthel's single-digit codes from 1 to 7.

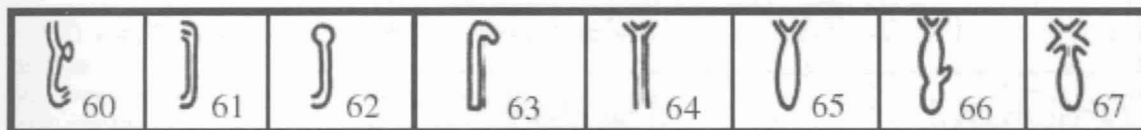


Figure 10d: How glyphs 61 to 64 are identical with hands 1 to 4, fig. 10b.

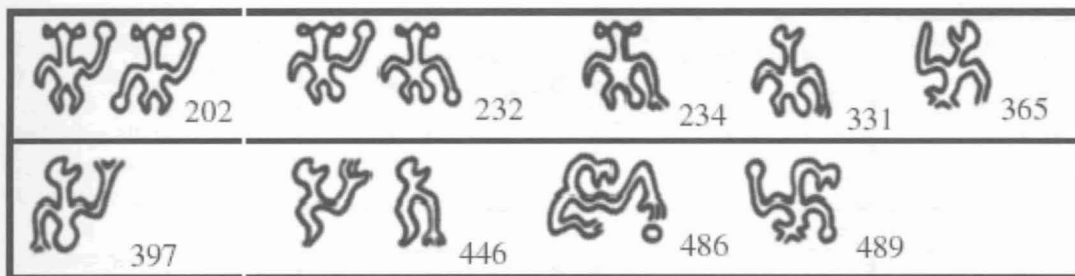


Figure 10e: Glyphs with lowered arms.

Digit 4: arm lifted, ending in a "fork"

Digit 5: arm lifted, no visible hand

Digit 6: arm lifted, hand with three fingers and a thumb showing, always turned to the right

Digit 7: arm extended horizontally, ending in a long "sleeve" reaching down to the ground

Digits 8 and 9 are also used, but they only represent unspecified, miscellaneous arm or hand shapes.

Note how code numbers 1 to 7 when used in isolation (Figure 10c) represent glyphs entirely different from the arms or hands symbolized by the same digits (Figure 10b), with the only exception of glyph 6, identical with arm 6 above (lifted, three fingers and a thumb). Also note how glyphs 61 to 64 of series 60 (Figure 10d) are identical with the hand shapes represented by digits 1 to 4 (Figure 10b). As a consequence, short of resorting to cumbersome circumlocutions, it is difficult to discuss these hand shapes without risking some confusion.

Although they occur most often lifted, arms are also

found in the down position, e.g. glyphs 202, 232, 234, 331, 365, 397, 446, 486, 489 (Figure 10e). There is no systematic way of representing this difference in Barthel's nomenclature.

In glyphs 400 to 409 and in most glyphs of series 600 the "arm dangling" is lengthened to reach the ground, thus resembling a wing while the legs are shortened. This lends them a distinctly ornithomorphic appearance.

*Leg Shapes – Second Digit of Codes (Figure 1a)*

Barthel's system distinguishes between only four leg shapes, but it does so in a complex manner, resorting to eight digits, from 0 to 7 (see some examples Figure 1a).

Digits 0,1: Glyph standing, both legs flexed, no visible

foot, very similar in appearance to the "relaxed arm." This is represented by digit 0 or 1 in second position in the code number. Digit 0 is used for glyphs with both legs of this type, unless both its arms are raised, in which case Barthel uses

digit 1.

Digits 2,4,5,7: Leg(s) stretched horizontally, usually ending in three toes, less often open-ended (that is, middle toe missing). This is variously represented as digit 2, 4, 5, or 7 in second position. Digit 7 is used when only one leg is visible

(and the glyph so appears as if sitting in profile); 2 when the other leg is standing, flexed (i.e. when it would be represented by 0 or 1); digit 4 when both legs are stretched horizontally, except when both arms are raised, in which case digit 5 is used.

Digit 3: Glyph standing, one leg straight, ending in a ball-shaped foot. It seems that in all cases the other leg is of type 1 (i.e. flexed, glyph standing).

Digit 6: Two "stumps" on the left, one closed, one open, and a single open stump on the right.

Digits 8 and 9 are used to represent other, miscellaneous leg shapes, or the absence of legs, or in signs whose leg shape should regularly be represented by another digit—for instance signs 180, 380 and 480 that should be respectively 126, 370 and 470.

*The Limbs of Ornithomorphic Glyphs (Figure 1a)*

The first ten glyphs of series 400 and most glyphs of series 600 are clear depictions of a bird. They occur with the same various upper and lower limbs as anthropomorphic glyphs,

except for the “relaxed arms” and the “flexed legs” in place of which we see “wings” and “tail feathers.” But note glyph 610, with the bird head of 600, yet with the limbs of 200 or 300, clearly anthropomorphic (Figure 1a).

#### Head Shapes—First Digit of Codes (Figures 1a, 10a)

Theoretically, the first digit of Barthel’s codes specifies the glyph’s head. In practice, there are too many head shapes for each to be represented by a single digit. In the 500 series (Figure 1a, 10a) the first *two* digits represent the head (50 “lollipop,” 52 “big nose” and so on) so that Barthel’s coding system breaks down completely there. Glyph 524, for instance (Figure 10a) should have 0 as its second digit, since 0 represents the flexed legs. But code 504 is already taken by a glyph with a lollipop head.

#### Freely Alternating Hand Shapes (Figures 11a-b, 10B)

Pozdniakov (1996:297) has observed that hand 6 (three fingers and a thumb) seemed to occur in free variation with hand 4 (a forked stick). Figure 11b shows a sample of such alternations affecting anthropomorphic glyphs on Tablets P and H. See, for instance, how glyph 356.3 at Pr1:128-173 has a fingers-and-thumb hand (hand 6), whereas the correspond-

ing glyph 304.3 in Hr1:118-160 has a forked stick (hand 4). Likewise in Pr1:252-295 glyph 254 (bottom elements partly erased, right hand = 4) corresponds to glyph V254 (right hand = 6) in Hr1:236-280. The same alternation is observed between glyph 306.3 in Pr4:356-390 and glyph 304.3 in Hr4:437-469, and again between glyph 244 in Pr4:94-123 and glyph 246 in Hr4:237-263.

Pozdniakov (1997) has further observed the same alternations when hands were not part of anthropomorphic glyphs, but of “abstract” glyphs. Thus (Figure 11b) glyph 4.6 in Pr4:509-549 where the “fang” (glyph 4) is connected to a lifted arm ending in hand 6 (fingers-and-thumb, Figure 10b), while the corresponding glyph 4.64 in Hr5:106-134 has a similar arm, but ending in hand 4 (forked stick). Glyph 56 at the end of Pr1:143-193 and the corresponding glyph, 84, in Hr1:132-178 show again a similar alternation: glyph 56 with a “croissant” for its lower part is topped by three vertical lines reminiscent of the three fingers of hand 6, while glyph 84, the lower part of which is also croissant-shaped, is topped by a “fork” reminiscent of hand 4.

#### Tentative Interpretations of some Glyphs

##### General Properties of Mixed Writing systems (Figure 12)

With most ancient mixed logographic and phonetic writing systems the scribe could, at will, write a word either as a single logogram, or as a logogram or a taxogram accompanied by phonetic complements (usually syllables, but also alphabetical signs in Egyptian), or even entirely phonetically. A prime example is Maya, which allowed for a bewildering number of ways of writing the same word. “Jaguar” for instance, pronounced “balam,” could be written as a single logogram, a picture of a jaguar’s head (conventionally transcribed here as BALAM in small capital letters), or entirely phonetically (ba-la-ma) or in almost any mixture: ba-BALAM, ba-BALAM-ma, or BALAM-ma (Figure 12, adapted from Scheele and Freidel 1990:52-53). Even our alphabetically written European languages

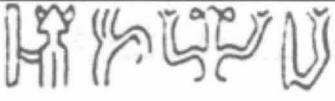





Pr1 252-295		Hr1 236-280	
Compare the hands of 254 with those of V254			
Pr4 356-390		Hr4 437-469	
Compare the hand of 306 with the hand of 304			
Pr4 94-123		Hr4 237-263	
Compare the hand of 244 with the hand of 246			

Figure 11a: Hand alternation in anthropomorphic glyphs.



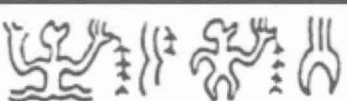
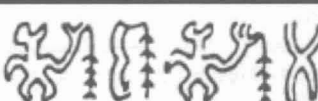
Pr4 509-549		Hr5 106-134	
Compare 4.6 with 4.64			
Pr1 128-173		Hr1 132-178	
Compare the top of 56 with the top of 84			

Figure 11b: Hand alternation in non-anthropomorphic glyphs.










				
1. BALAM	2. ba-BALAM	3. BALAM-ma	4. ba-BALAM-ma	5. ba-la-ma
				
ba	la	ma	BALAM	
phonograms			logogram	

Figure 12: Five ways of writing “jaguar” in Maya and their constituent elements.

Night	Englert	Thomson	Métraux	Glyphs	Probable value
1 N.M.	Oata	Oata	Ata	 40.10	
2	Ohiro	Oari	Ari	 40-30a	30 = <i>hiro</i> “to twist into a rope” <i>ro</i> (syllabic value)
10	Ohua	Ohua	Hua	 74f.40	74f = <i>hua</i> “testicles, fruit”
11	Otua	Otua	Atua	 59f-40	59f = feather cloak, hence: <i>atua</i> “god, lord, gentleman”
12	Maure	Maure	Maure	 44.40	
14	Rakau	Rakau	Rakau	 143	
15 F.M.	Omotohi	Omotohi	Motohi	 152	
23 L.Q.	Orongo	Orongo	Rongo	 3.40	3 = <i>maro</i> “feather garland” <i>ro</i> (syllabic value)
24	Orongo tane	Orongo tane	Rongo Tane	 600-40	600 = <i>tavake</i> “frigate bird” <i>ta</i> (syllabic value)

Figure 13: The nine “named” nights of the Lunar Calendar of Tablet Mamari.

show somewhat similar properties. In English for instance we may indifferently write “\$5” or “five dollars.” Note how the order of the elements of the logographic spelling (“\$5”) even differs from that of the full phonetic spelling (“five dollars”), and how a logogram, here “\$,” can cumulate phonetic and ideographic functions in some cases, e.g. “Micro\$oft.” It would be unwise to rule out such behaviors when attempting to decipher the Rongorongo.

*Tablet C: Some Night Names of the Lunar Calendar (Figure 13)*

Barthel was the first to draw attention to a probable list of nights or night names on Tablet C (also known as “Mamari”) extending from Ca6.160 to Ca9.10. Barthel belonged to the school of the Mayanist Eric Thompson, who stubbornly rejected any possibility of a phonetic component in Maya writing, and thus he was led to see a purely logographic system in the Rongorongo. This prejudice prevented any further advance, just like Thompson’s single-mindedness delayed the decipherment of Maya for decades (Coe 1992). Viktor Krupa’s 1971 interpretation of the lunar calendar, also based on the premise of a pure logographic system, amounts to glossolalic gibberish: “The feast of the deity of the moonlight. The feast of feeding the moonlight. The rays of the fair sun are asleep. The moon is being made. The glimmering moon. The feast of the deity of the moonlight. Rongo is feeding the moonlight,” and so on. Around 1985 I independently rediscovered this lunar calendar (not having read Barthel closely as my German was extremely poor, I was unaware of his identification of the calendar). The long sequence of crescent-shaped glyphs and the presence in their middle of an ovoid pictogram containing an anthropomorphic figure seated above a heap of stones, a striking representation of the “cook in the moon” of Polynesian mythologies (the stones being those of an *umu*), made it certain that these lines had to do with lunar cycles. Cross-correlating this with the list of nights collected by William Thomson in 1886, the times of the phases, risings and settings of the moon during the period covered, and the oral traditions collected by Routledge about the ancient festivals led to the probable identification of a few glyphs as names for some nights in Thomson’s version of the calendar (Guy 1990). Much later, a re-analysis in the light of the data contained in Englert’s *La Tierra de Hotu Matu’a* led to the identification of the glyph corresponding to the second night as another probable phonogram, “hiro” (Guy 2001).

The calendar of Tablet Mamari is composed of 21 unnamed nights, each represented by glyph 40 (a thin shallow crescent), and nine named nights, two of which (Rakau and Omotohi) are represented by pictograms, and the remaining seven by various glyphs each accompanied by the crescent glyph 40 (Figure 13). Consider the night called Otua according to both Englert and Thomson, Atua according to Métraux. The glyph accompanying the crescent is a credible pictogram of a feather cloak, the attribute of chiefs and priests and of celestial beings. Both names for this night, Atua and Otua, are exactly or closely homophonous with “*atua*” which means god, or lord, viz Englert 1993:315 “*atua*: el Señor, Dios; *te*

*Atua ko Makemake*, el dios Makemake... *Señor, persona respectable*.” This, of course, should be dismissed as a mere coincidence if it were not for two further pieces of evidence for phonetic values:

The second night, called Ohiro or Hiro according to some sources, Oari or Ari according to others, is represented by the crescent glyph followed by a doubled-up “feather garland.” Englert’s dictionary (1993:322) has a verb “*hiro*” meaning to twist into a rope (*torcer fibras de árboles para hacer lienzas, cordeles, sogas*).

The crescent for the night called Ohua or Hua is accompanied by what might be the pictogram of a fruit, or of a scrotum. Englert gives “*hua*” as meaning testicle or fruit (*testículo; frutos de la tierra*).

It is of course possible that these are nothing but three unrelated coincidences, but that seems rather improbable. On the other hand, the other phonetic correspondences suggested in Figure 13 (*Rongo, Rongo-tane*) are more speculative.

*A Harmonic Sequence common to Tablets C, H, and P (Figures 14, 11a-b)*

Segment Cb10.63-202 of the Mamari tablet, which contains the lunar calendar on its other side, shows a harmonic sequence with the “feather cloak” glyph (59f) as its clef. The “feather cloak” occurs three times, successively connected to a “fingers-and-thumb” hand (6), a “flower” (8), and a “feather garland” (3). This harmonic sequence is followed by three glyphs, two of them complex (V71 and 10.2). A much similar textual fragment occurs on Tablet H, in segment Hr4.20-136, and on Tablet P, in segment Pr3.458-598 (Figure 14). We have, in Barthel’s transcription:

Cb10:	59f.6-	59f.8-	59f.3-	1-V391.V71-	10.2
Hr4:	451f-	8:451f-	59f.3-	1.71-	10.20
Pr3:	456f.3-	455f.8-	455f.30b-	73? 6? 71-	10.20

The transcription does not convey well the similarities between the three harmonic sequences and the glyph sequences that follow. For instance, glyphs 456f and 455f are similar to glyph 59f with its upper part replaced by the head of the 300-series, and they hold the accompanying glyphs instead of being connected to them as 59f is on Cb10. This gives them a distinct anthropomorphic appearance (“manikins in feather cloaks” as it were) while retaining the resemblances with 59f on Cb10, but that is not apparent from the transcription.

Glyph 451f in Hr4.20-136 is somehow problematic. The next glyph, 8:451f, wears the “flower glyph” (8) as a mask. Since this glyph corresponds to those with a “fingers-and-thumb” hand on Cb10 and Pr3 we expect to see it wearing a mask in the shape of the “fingers-and-thumb” hand (6) or of the three lines which Pozdniakov has identified as equivalent to it in many non-anthropomorphic glyphs (see glyph 56 in Pr1.128-173, Figure 11b). Instead, we see it with the head of the 300-series, unmasked. One should refrain from seeking possible explanations. First, the “tail end” of 451f is open and



Cb10.63-202	 665-667-V107x-59f.6-59f.8-59f.3-1-V391.V71-10.2-52x.V66-4-760
Hr4.20-136	 755-260.1-260-591-5-1-755-451f.8:451f-59f.3-1.71-10.20-73f-V59f-2
Pr3.458-598	 6.74f-752-360.1.260-V9-752-456f.3-455f.8-455f.30b-73?6?71-10.20-1f-V59f-2

Figure 14: Harmonic sequence on C, H and P with the “feather cloak” as its clef.

looks unfinished. It is possible that it was worn down and illegible. Second, it is also possible that the head is an erroneous interpretation of a poor-quality rubbing. In the absence of clear photographs we cannot say.

The corresponding glyph (456f.3) in Pr3.458-598 also poses a problem. We expect to see the “manikin in a feather cloak” with its arm lifted, ending in a “fingers-and-thumb” hand, introducing the next “manikin in a feather cloak” with its arm ending in a “flower” (455f.8). Glyph 456f indeed has a “fingers-and-thumb” hand, but it is also accompanied by a “feather garland” (3) dangling from its thumb. Why so? This problem has a ready solution. It is common for the glyphs of mixed writing systems to have multiple functions depending on their environment: phonetic, logographic, taxographic. The “feather garland” is often found as the clef of harmonic sequences (for instance in Hr1.132-178, Figure 11a). I have argued elsewhere (Guy 2001) in the discussions of the lunar calendar that the “feather garland” might be a taxogram for revered objects or persons, since feathers were highly valued and featured prominently in ceremonies (Routledge 1919:245-246). We would then have here a phenomenon very much akin to that familiar to Assyriologists and Egyptologists and known as “overspelling.” Here, we would have the “feather cloak” as the taxogram for divine entities reinforced (“overspelt”) by the “feather garland,” a taxogram for prized objects or persons.

*Glyph 3 = Glyph 30 = “ro”?* (Figures 14, 13, 12)

Note how in Pr3.458-598 (Figure 14) the last of the three clefs, a “manikin in a feather cloak” (455f) holds the same glyph (30) as the one associated with the second night of the lunar calendar, “Hiro” (Figure 13), but upside down. Note how the corresponding glyphs in Cb10.63-202 and in Hr4.20-136 (Figure 14) are the same “feather garland” which also occurred associated with night “Rongo” of the calendar (Figure 13, again upside down). Perhaps this direction reversal has no distinctive function, that is, a glyph right side up is equivalent to the same upside down, in other words, they are alloglyphs of the same glypheme. In that case, the “feather

garland” (3) and the “double feather garland” (30) would likely convey the same phonetic value (possibly “ro”). If so, notice how night “Hiro” is written in the calendar with its phonetic complement “ro” following the taxogram for calendar nights (glyph 40, the crescent), whereas night “Rongo” is written with “ro” preceding it. That is precisely what one would expect in a mixed logographic and phonetic writing system, and that is indeed what is observed in Maya for instance (cf. above the example of *balam* “jaguar,” Figure 12).

*59f.6-59f.8-59f.3 = a Trisyllabic Name or Three Names—Glyph 30 = “hiro”?*

If glyph 59f is indeed the pictogram of a feather cloak and was used as a phonogram for “*atua*,” as it seems to have been in the lunar calendar, then it is possible that it functioned also as a taxogram (a classifier) for chiefs, priests, or celestial beings. In which case we may then have in this sequence 59f.6-59f.8-59f.3, three words designating such beings, or three personal names, or a single word or name. Let us examine those two possibilities.

A trisyllabic name. Then it might have “ro” for its last syllable.

Three names, probably of gods or great chiefs, the third one ending in “ro.” According to Englert there might have been a rain god called “Hiro” (Englert 1993:322: “*¿nombre de una deidad que invocaban pidiendo que hiciese caer lluvia?*”) On tablet P this third name is “spelled” with glyph 30, the same as is used in the calendar for night “Hiro” or “Ohiro.” One is tempted to see there the name of this putative rain god Hiro, fully “spelled out” on Tablet P, and only “spelled” by its final syllable on Tablets C and H. This suggests another phonetic value for glyph 30: “*hiro*,” or perhaps again a dual phonetic value: both “ro” and “hiro.”

The accumulation of hypotheses in the foregoing discussion demonstrates how unlikely it is that Rongorongo script will ever be fully deciphered. Each hypothesis has to be verified and for that a much larger corpus is needed than what we have.

# CONCLUSION: THE ALMOST CERTAIN PROPERTIES OF RONGORONGO WRITING

Many glyphs that, at first sight, appear to be basic units are in fact complex agglomerates.

Glyphs were read from left to right. Successive glyphs occurred, at the whim of the scribe, merely juxtaposed and separated by a space, or connected in a variety of ways, horizontally and vertically (stacked).

When stacked, the bottom glyph was read first.

Some elements, such as the limbs of glyph 200, were purely "eugraphic," that is, they only served to make glyphs into whole, balanced anthropomorphic or zoomorphic figures, and had neither phonetic nor semantic function.

Some glyphs functioned as semantic classifiers (taxograms) and could be omitted.

The small number of different elements entering in the formation of most anthropomorphic and zoomorphic glyphs, and of many so-called abstract glyphs, argues for phonetic values, probably syllabic.

## REFERENCES

- Barthel, T. S. 1958. *Grundlagen zur Entzifferung der Osterinselschrift*. Hamburg: Cram, de Gruyter.
- Butinov, N. A. and Yu. V. Knorozov, 1957. Preliminary Report on the Study of the Written Language of Easter Island. *Journal of the Polynesian Society* 66(1):5-17.
- Coe, M. 1992. *Breaking the Maya Code*. London: Thames and Hudson.
- Crystal, D. 1987. *The Cambridge Encyclopedia of Language*. Cambridge: University Press.
- Englert, S. 1993. *La Tierra de Hotu Matu'a* (sixth edition). Santiago de Chile: Editorial Universitaria.

- Guy, J. B. M. 1982. Fused Glyphs in the Easter Island Script. *Journal of the Polynesian Society* 91(3):445-447.
- Guy, J. B. M. 1985. On a Fragment of the "Tahua" Tablet. *Journal of the Polynesian Society* 94(4):367-388.
- Guy, J. B. M. 1990. The Lunar Calendar of Tablet Mamari. *Journal de la Société des Océanistes* 90(2):135-149.
- Guy, J. B. M. 1998. Does the Santiago Staff Bear a Cosmogonic Text? *Anthropos* 93:552-555.
- Guy, J. B. M. 2001. Le calendrier lunaire de la tablette Mamari. *Le Bulletin du Centre d'Etudes sur l'Île de Pâques et la Polynésie* 47:1-4.
- Krupa, V. 1971. "Moon" in the writing of Easter Island. *Oceanic Linguistics*. 10(1):1-10.
- Kudrjartsev, B. G. 1949. Pismennost' ostrova Paskhi. *Sbornik Muzeja Antropologii i Ehtnografii* 11:175-221.
- Ol'derogge, D. A. 1947. Parallel'nye teksty nekotorykh ieroglificheskikh tablits s ostrova Paskhi (po neopublikovannym dannym B.G. Kudrjartseva). *Sovetskaja ehtnografija*. 4:234-238.
- Ol'derogge, D. A. 1949. Dopolnenie k stat'e B.V. Kudrjartseva—Parallel'nye teksty tablits ostrova Paskhi. *Sbornik Muzeja Antropologii i Ehtnografii*. 11:222-236.
- Pozdniakov, K. I. 1996. Les bases du déchiffrement de l'écriture de l'Île de Pâques. *Journal de la Société des Océanistes*. 103(2):289-303.
- Robinson, A. 2002. *Lost Languages: The Enigma of the World's Undeciphered Scripts*. London: McGraw-Hill.
- Routledge, K. S. 1919. *The Mystery of Easter Island*. London: Hazell Watson & Viney.
- Scheele, L. and D. Freidel, 1990. *A Forest of Kings: The Untold Story of the Ancient Maya*. New York: Quill, William Morrow.
- Thomson, W. J. 1891. *Te Pito te Henua or Easter Island*. Washington: Smithsonian Institution.

**SOUTH AMERICAN EXPLORERS**  
<http://www.saexplorers.org>

**"THE BEST SOURCE OF INFORMATION ON S.A. TRAVEL!"**

Join now and receive trip planning advice; discounts on maps, guidebooks, trips and schools; fax, e-mail and storage at our...

**CLUBHOUSES IN LIMA AND CUSCO, PERU, AND QUITO, ECUADOR!**

**U.S. HEADQUARTERS:** 126 Indian Creek Rd, Ithaca, NY 14850, Tel: (607) 277-0488, Fax: (607) 277-6122  
[explorer@saexplorers.org](mailto:explorer@saexplorers.org)

**CUSCO:** [saec@amauta.rcp.net](mailto:saec@amauta.rcp.net), **LIMA:** [limclub@terra.com.pe](mailto:limclub@terra.com.pe), **QUITO:** [explorer@saec.org.ec](mailto:explorer@saec.org.ec)

